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A-S

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
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09/044,350 03/19/98 PEETERS

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EXAMINER

NOGUEROLA, A

ART UNIT

PAPER NUMBER

1743

6

DATE MAILED:

10/15/99

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary

Application No.
09/044,350

Applicant(s)
John Peeters

Examiner
Alex Noguera

Group Art Unit
1743



☒ Responsive to communication(s) filed on Sep 30, 1999

☐ This action is **FINAL**.

☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

A shortened statutory period for response to this action is set to expire 3 month(s), or thirty days, whichever is longer, from the mailing date of this communication. Failure to respond within the period for response will cause the application to become abandoned. (35 U.S.C. § 133). Extensions of time may be obtained under the provisions of 37 CFR 1.136(a).

Disposition of Claims

☒ Claim(s) 1-37 is/are pending in the application.

Of the above, claim(s) _____ is/are withdrawn from consideration.

☒ Claim(s) 1-21 and 25-31 is/are allowed.

☒ Claim(s) 22-24 and 32-37 is/are rejected.

☐ Claim(s) _____ is/are objected to.

☐ Claims _____ are subject to restriction or election requirement.

Application Papers

☐ See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.

☐ The drawing(s) filed on _____ is/are objected to by the Examiner.

☐ The proposed drawing correction, filed on _____ is ☐ approved ☐ disapproved.

☐ The specification is objected to by the Examiner.

☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

☐ All ☐ Some* ☐ None of the CERTIFIED copies of the priority documents have been
☐ received.

☐ received in Application No. (Series Code/Serial Number) _____.

☐ received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

*Certified copies not received: _____

☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

☐ Notice of References Cited, PTO-892

☒ Information Disclosure Statement(s), PTO-1449, Paper No(s). 5

☐ Interview Summary, PTO-413

☐ Notice of Draftsperson's Patent Drawing Review, PTO-948

☐ Notice of Informal Patent Application, PTO-152

--- SEE OFFICE ACTION ON THE FOLLOWING PAGES ---

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DETAILED ACTION

Response to Amendment

1. Applicant's amendment of September 30, 1999 is sufficient to render claims 1-18, 25-30, and 31 allowable. Claims 19-21 were allowed in the previous Office action.

Response to Arguments

2. Applicant's arguments filed September 30, 1999 have been fully considered but they are not persuasive regarding claims 22-24 and 32-37. The rejections of claims 22-24 under 35 U.S.C. 103(a) as being unpatentable over JAPIO abstract of Hajme et al. in view of Nakagawa (US 5,730,940) is withdrawn and replaced by a rejection under 35 U.S.C. 103(a) as unpatentable over Nakagawa. As for claims 32-37, the examiner does not understand how applicant's invention is patentability distinguished from Lipskier. For example, applicant's claim 32 is

[a] silicon chip to detect individual proteins comprising at least one surface region sensor manufactured with Angstrom level precision *wherein said surface region of the sensor complements exactly the three dimensional shape of a protein* [examiner's emphasis].

Yet applicant himself argues that "*Lipskier*, however, provides a "molecular fingerprint" material of the type in which an organic polymer is cross-linked in the presence of a molecular species to form cavities adapted to selectively capture the subject material. *In effect, the polymer cross-links*

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around the subject molecule which is leached out to form the cavities [examiner's emphasis]. "

Page 6 of applicant's arguments. That is applicant states that Lipskier teaches forming a surface region of the sensor that complements exactly the three dimensional shape of the analyte molecule.

Status of the Rejections in the Office Action of June 21, 1999

3. All previous rejections are withdrawn. New rejections have been made below. No new art has been cited.

Claim Objections

4. Claim 22 is objected to because of the following informalities:
- a) claim 22, line 4: -- and -- should be after “;”.

Appropriate correction is required.

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5. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

6. Claims 32, 33, and 35 are rejected under 35 U.S.C. 102(e) as being clearly anticipated in the case of claims 32, 33 and anticipated in the case of claim 35 by Lipskier (US 5,910,286).

Addressing claim 32. See the abstract; column 5, lines 14-19 and col. 6, ln. 17-21.

Addressing claims 33. See Figure 3 and col. 5, ln. 14-19.

Addressing claim 35. A protein-specific receptor is anticipated because Lipskier teaches a receptive site that is polypeptide-specific (col. 6, lines 17-21).

Claim Rejections - 35 USC § 103

7. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

8. Claims 22-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakagawa (US 5,730,940).

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Addressing claim 22. Nakagawa teach a sensor system for detecting biological molecules, the sensor system comprising (the abstract)

a substrate (element 63 in Fig. 1);

a micro cantilever on the substrate (element 62 in Fig. 1 and col. 8, ln. 22-26); and

at least one probe disposed on the micro cantilever (element 61 in Fig. 1).

In Fig. 1, which is “the principle [sic] mechanism”, the probe is an atomic force microscope (AFM) (col. 7, ln. 3-5). It would have been obvious to one with ordinary skill in the art at the time the invention was made that having an electrode as the probe is within the scope of Nakagawa because Nakagawa indicates that the AFM embodiment in Fig. 1 is an example of a Type 1 scanning probe in his invention (col. 7, ln. 3-6) and a scanning electrochemical microscope (SEM) is also a Type 1 scanning probe (col. 6, ln. 50-54). That is, the AFM probe illustrates a basic configuration for all the Type 1 probes which includes electrodes.

Furthermore, in Figure 3, which directly illustrates a SEM embodiment (element 93 in Fig. 3, see also col. 8, ln. 26-60, claim 1, and col. 20, ln. 20-61), although the electrode is fixed in space and the substrate moves (col. 8, ln. 49-56) it would have been obvious to one with ordinary skill in the art at the time the invention was made that having an electrode disposed on micro cantilever is within the scope of Nakagawa because Nakagawa refers to the previous embodiments shown in Figures 1 and 2 (col. 8, ln. 55-59) in which the probe is clearly disposed on the micro cantilever which is on the substrate (col. 7, ln. 3-13) and he states that “[o]f course a probe

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can move in conjunction with the piezoelectric scanner instead of a substrate” (col. 8, ln. 59-60).

Addressing claim 23. Nakagawa teaches using laser light as a detection signal (col. 7, ln. 3-16).

Addressing claim 24. Nakagawa also teaches piezoelectric detector (col. 7, ln. 3-31 and col. 8, ln. 49-56).

9. Claim 34 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lipskier (US 5,910,286) as applied to claims 32, 33, and 35 above. Lipskier indicates one metal, in the form of Angstrom precision aluminum electrodes, in the surface region but does not indicate a plurality of metals (col. 7, ln. 55-60). It would have been obvious to one with ordinary skill in the art at the time the invention was made to provide a plurality of metals in order to have an array of electrodes with a range of electrical characteristics suitable for increasing the range of chemical species that can be analyzed or providing additional measurements on the same chemical species.

10. Claim 36 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lipskier (US 5,910,286) as applied to claims 32, 33, and 35 above, and further in view of David Page

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("Principles of Biological Chemistry", Willard Grant Press, 1976, page 45). Lipskier does not mention deriving information from x-ray diffraction studies to make the sensor. Page teaches that x-ray crystallography is used for structure analysis of proteins (page 45). It would have been obvious to one with ordinary skill in the art at the time the invention was made to use information derived from x-ray diffraction to make the sensor because such information will provide important detail that will assist in the accurate design of the surface of the sensor for detecting proteins.

11. Claim 37 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lipskier (US 5,910,286) as applied to claims 32, 33, and 35 above, and further in view of CAPLUS abstract of Clowes et al. ("Improved methods for structural studies of proteins using nuclear magnetic resonance spectroscopy", Curr. Opin. Biotechnol. (1995), 6(1), 81-8). Lipskier does not mention deriving information from x-ray diffraction studies to make the sensor. Clowes et al. teach that NMR is used for structure analysis of proteins (abstract). It would have been obvious to one with ordinary skill in the art at the time the invention was made to use information derived from NMR to make the sensor because such information will provide important detail that will assist in the accurate design of the surface of the sensor for detecting proteins.

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Allowable Subject Matter

12. Claims 1-21, 25-30, and 31 are allowed.

13. The following is a statement of reasons for the indication of allowable subject matter: applicant's invention of a sensor for detecting biological molecules and a method of sequencing nucleic acids is unobvious over the prior art of record.

Independent claim 1 is unobvious because of the required combination of limitations.

Claims 2-18 and 31 depend directly or indirectly from claim 1.

Independent claim 25 is unobvious because of the required combination of limitations.

Claims 26-30 depend directly or indirectly from claim 25.

Claims 19-21 were addressed in the previous Office action.

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alex Noguerola whose telephone number is (703)-305-5686.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jill Warden, can be reached at (703)-308-4037. The unofficial fax phone number, for example, for faxing a proposed amendment, for this Group is (703)-305-7719. The official fax phone number, for example, for faxing an amendment to be entered, for this Group is (703)-305-7718.

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Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist whose telephone number is (703)-308-0651.

Alex Noguera

October 13, 1999


T. TUNG
PRIMARY PATENT EXAMINER
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